# National Polar-orbiting Operational Environmental Satellite System (NPOESS)

# NPOESS Preparatory Project (NPP) Environmental Data Products Quality and Latency


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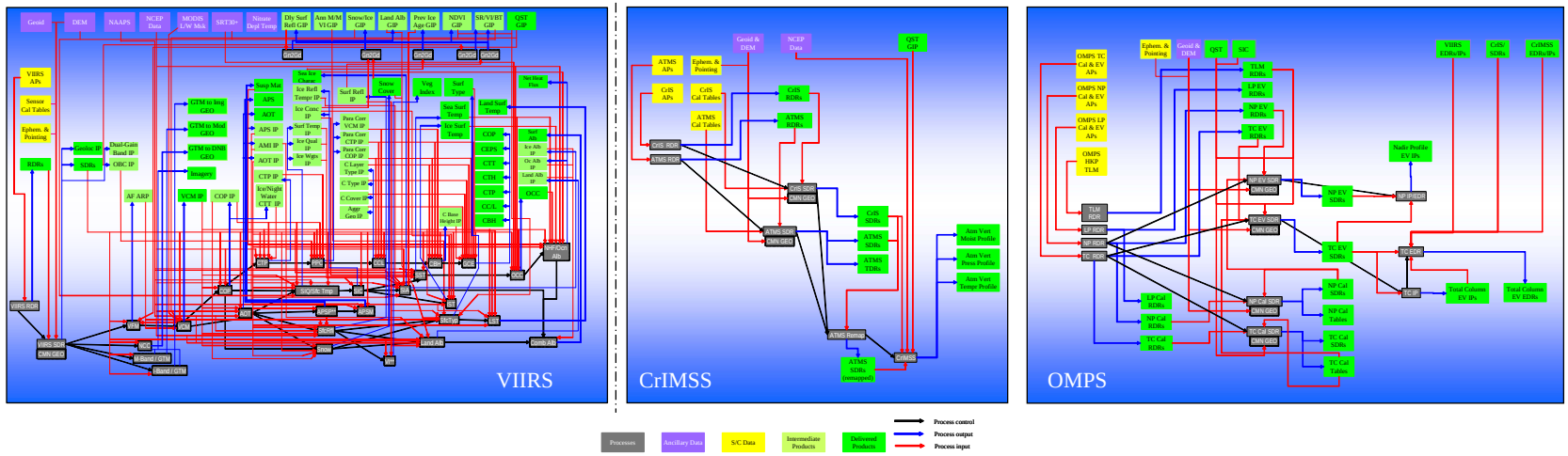



NPOESS products are created from a complex network of processing algorithms. A number of interdependencies between algorithms exist in order to provide the required data quality to the end User. The diagrams above illustrate the interdependencies between products and processes within the Interface Data Processing Segment (IDPS) needed to generate the NPP-era SDRs, EDRs, and Gridded Intermediate Products (GIP's). The algorithm interactions for the NPOESS era will be even more intricate.

Attributes: The 25 NPP Environmental Data Records (EDRs) are specified by 449 individual performance attributes (in addition to latency), which detail all pertinent aspects of the EDRs' performance. Of the 449 attributes, 24 do not currently meet the Integrated Operational Requirements Document (IORD) requirements, and are being worked. Of the non-compliant attributes, 18 are EDR-specific mapping uncertainty parameters associated with VIIRS line-of-sight stability errors in the terminator orbit.

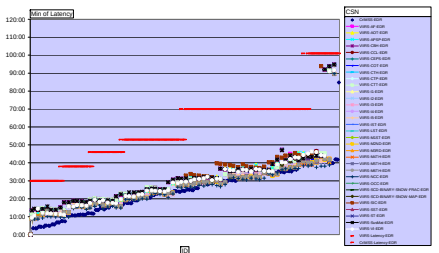
### IORD Compliant EDRs

| VIIRS | | | | CrIMSS | OMPS |
|---|---|---|---|---|---|
| Imagery | Veg Index | Cld Eff Part Size | Cld Top Press | Vert Moist Prf | Ozone TC |
| Susp. Matter | Surf Type | Cld Top Temp | Cld Base Height | Vert Temp Prf | |
| Surf Albedo | Cld Opt Prop | Cld Top Height | | Vert Press Prf | |
| Sea Surf Temp | Ice Surf Temp | | | | |

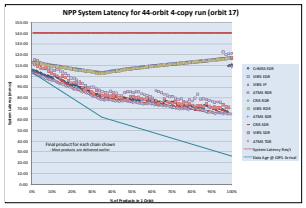
### VIIRS EDRs In Work to Meet IORD Requirements

| | | | |
|---|---|---|---|
| Aero Opt Thk | Performance expected to be similar to MODIS with improved spatial resolution. Additional enhancement for AOT over land possible, based on collection 5 MODIS algorithm | Snow Cover | Research is being monitored for potential infrared sensors use to determine snow cover depth. Snow fraction is being retrieved using imaginary resolution binary map. Expected Uncertainty of 25%. Spectral mixing algorithm does not work at this time and will not be implemented operationally. |
| Sea Ice Age | Performance depends on quality of climatology, which is expected to improve with MIS data. SIA energy balance for classification of First Year and New Young ice require further evaluation. Daytime performance is better, approaching spec for Probability of Correct Type. | Ocean Color/Chl | Atmospheric Correction over Ocean inherent algorithm errors are being estimated, based on sensor test data. Performance for NPP slightly degraded, due to presence of optical crosstalk (some performance compensation via generation of look-up table based on measured relative spectral response). Performance for NPOESS will be better than NPP, due to use of remanufactured IFA for Visible and NIR spectral bands |
| Cld Cvr/ Layers | Performance expected to be similar to MODIS, with improvements in some areas. Work continuing in collaboration with the science community to improve probability of correct typing for clear day over land and under all required environmental conditions. Cloud shadow detection algorithm implemented. | Land Surf Temp | Emissivity knowledge limits precision of retrieval. Expected performance of 1.0K using split window during day. Science limitation is due to variation in surface emissivity within land surface types |

Figure 2 – EDR Quality Assessment




The IDPS NPP Latency requirement is shown by the red lines. They specify the maximum time allowed to deliver a given percentage of the products on a per orbit basis. The data show the latency of individual products by granule within orbit 17 of a 44 orbit run, delivered four separate times. The four copy delivery portion of the test demonstrates the maximum required delivery volume at a given Central.




This graph compares IDPS latency to the System latency requirement (red line). The data show the latency of the last product generated in a given granule within orbit 17 of a 44 orbit run, delivered four separate times. The System latency requirement only applies to EDRs, but RDRs and SDRs are shown as well for completeness. Both graphs illustrate that IDPS outperforms its NPP latency requirements by a considerable margin.

Figure 3 – IDPS Latency Assessment